28. A method of producing a therapeutic agent comprising the steps of the method of any one of claims 25 to 27; and
    (i) synthesizing the compound obtained or identified in step (b) or an analog or derivative thereof in an amount sufficient to provide said agent in a therapeutically effective amount to a patient; and/or
    (ii) combining the compound obtained or identified in step (b) or an analog or derivative thereof with a pharmaceutically acceptable carrier

29. An activator/agonist or inhibitor/antagonist of phosphate metabolism or binding partner of phosphatonin obtained by the method of any one of claims 25 to 27.

30. A composition comprising a polypeptide of any one of claims 1 to 6, or 15 to 18, the polynucleotide of any one of claims 7 to 10, a vector of claim 11, an antibody of claim 19, the nucleic acid molecule of claim 20 or the activator/agonist, inhibitor/antagonist or binding partner of claim 29.

31. The composition of claim 30 which is a pharmaceutical composition and further comprises a pharmaceutically acceptable excipient, diluent or carrier.

32. The composition of claim 31 which is a diagnostic composition and further comprises means for detection.

33. Use of a polypeptide of any one of claims 1 to 6 or 15 to 18 or a DNA encoding and capable expressing said polypeptide or the activator/agonist, binding partner of claim 29 or the antibody of claim 19, for the preparation of a medicament for treatment of a disorder of phosphate metabolism.

34. Use of a polypeptide of any one of claims 1 to 6 or 15, 16 or 18 or a DNA encoding and capable expressing said polypeptide, the activator/agonist or binding partner of claim 29 or the antibody of claim 19, for the preparation of a medicament for the treatment of hyperphosphatemia.

35. Use of a polypeptide of any one of claims 1 to 6, 15, 16 or 18 or a DNA encoding and capable expressing said polypeptide or the activator/agonist,

binding partner of claim 29 or the antibody of claim 19, for the preparation of a medicament for the treatment of renal osteodystrophy, hyperphophatemia in renal dialysis/pre-dialysis, secondary hyperparathyrodism or osteitis fibrosa cystica.

36. Use of a polypeptide of any one of claims 1 to 6, 15, 17 or 18 or a DNA encoding and capable expressing said polypeptide, the antibody of claim 19, the nucleic acid molecule of claim 20 or the inhibitor/antagonist of claim 29, for the preparation of a medicament for the treatment of hypophosphatemia.

37. Use of a polypeptide of any one of claims 1 to 6, 15, 17 or 18, or a DNA encoding and capable expressing said polypeptide, the antibody of claim 19, the nucleic acid molecule of claim 20 or the inhibitor/antagonist of claim 29, for the preparation of a medicament for the treatment of X-linked hypophosphatemic rickets, hereditary hypophosphatemic rickets with hypercalcuria (HHRH), hypomineralised bone lesions, stunted growth in juveniles, oncogenic hypophosphatemic osteomalacia, renal phosphate leakage, renal osteodystrophy, osteoporosis, vitamin D resistant rickets, end organ resistance, renal Fanconi syndrome, autosomal rickets, Paget's disease, kidney failure, renal tubular acidosis, cystic fibrosis or sprue.

38. Use of a polypeptide of any one of claims 1 to 6, 15, 17 or 18, or a DNA encoding and capable expressing said polypeptide, the antibody of claim 19, the nucleic acid molecule of claim 20 or the inhibitor/antagonist of claim 29, for the manufacture of a medicament for the treatment of a bone mineral loss disorder.

39. Use of a polypeptide of any one of claims 1 to 6, 15, 17 or 18 and PHEX metallopeptidase for the manufacture of a combined preparation for simultaneous, separate or sequential use for the treatment of a disorder of phosphate metabolism.

40. Use of a transformed osteoblast or bone cell line capable of phosphatonin overexpression for the production of phosphatonin.

Abstract

The present invention relates to a novel human protein called phosphatonin, and isolated polynucleotides encoding this protein. Also provided are vectors, host cells, antibodies, and recombinant methods for producing this human protein. The invention further relates to diagnostic and therapeutic methods useful for diagnosing and treating disorders related to this novel human protein.